CLAIMS

1. A solid electrolytic capacitor comprising a valve-acting metal having a dielectric film layer formed on the surface thereof, a solid electrolyte layer and an electrically conducting layer which are formed on the dielectric film layer, wherein at least one of said solid electrolyte layer and electrically conducting layer contains a rubber-like elastic material.

2. The solid electrolytic capacitor as claimed in claim 1, wherein the electrically conducting layer is an electrically conducting layer containing metallic powder or an electrically conducting layer comprising an electrically conducting carbon layer and a layer containing metallic powder formed on the conducting carbon layer.

3. The solid electrolytic capacitor as claimed in claim 1 or 2, wherein the rubber-like elastic material is contained in the solid electrolyte layer.

4. The solid electrolytic capacitor as claimed in claim 2, wherein the rubber-like elastic material is contained in the conducting carbon layer.

5. The solid electrolytic capacitor as claimed in

claim 2, wherein the rubber-like elastic material is contained in the electrically conducting layer containing metallic powder.

6. The solid electrolytic capacitor as claimed in claim 2, wherein the rubber-like elastic material is contained in the solid electrolyte layer and the electrically conducting carbon layer.

7. The solid electrolytic capacitor as claimed in claim 2, wherein the rubber-like elastic material is contained in the solid electrolyte layer and the electrically conducting layer containing metallic powder.

8. The solid electrolytic capacitor as claimed in claim 2, wherein the rubber-like elastic material is contained in the electrically conducting carbon layer and the electrically conducting layer containing metallic powder.

9. The solid electrolytic capacitor as claimed in claim 2, wherein the rubber-like elastic material is contained in all of the solid electrolyte layer, the electrically conducting carbon layer and the electrically conducting layer containing metallic powder.

10. The solid electrolytic capacitor as claimed in any

one of claims 1 to 9, wherein the solid electrolyte layer has a film-like or lamellar structure.

11. The solid electrolytic capacitor as claimed in claim 1, 3, 6, 7 or 9, wherein the solid electrolyte layer is formed of an electrically conducting polymer composition in the form of a film-like or lamellar structure containing from 0.01 to 25 mass% of a rubber-like elastic material.

12. The solid electrolytic capacitor as claimed in claim 11, wherein the rubber-like elastic material is at least one of natural rubbers and synthetic elastomers.

13. The solid electrolytic capacitor as claimed in claim 11 or 12, wherein the rubber-like elastic material is fluororubber.

14. The solid electrolytic capacitor as claimed in claim 11, wherein the electrically conducting polymer is a polymer containing at least one repeating unit of a divalent group selected from pyrrole, thiophene, aniline and derivatives thereof.

15. The solid electrolytic capacitor as claimed in claim 2, 5, 7, 8 or 9, wherein the electrically conducting layer containing metallic powder comprises an

electrically conducting filler containing metal powder and a binder mainly comprising fluororubber.

16. The solid electrolytic capacitor as claimed in claim 15, wherein 80 mass% or more of the binder is fluororubber.

17. The solid electrolytic capacitor as claimed in claim 15, wherein 80 mass% or more of the electrically conducting filler is silver powder.

18. The solid electrolytic capacitor as claimed in claim 15 or 17, wherein the electrically conducting filler has an average particle size of from 1 to 10 μm.

19. The solid electrolytic capacitor as claimed in claim 15, 17 or 18, wherein the electrically conducting filler content is from 50 to 95 mass% and the binder content is from 5 to 50 mass%.

20. The solid electrolytic capacitor as claimed in claim 15, wherein the electrically conducting layer containing metallic powder is formed of an electrically conducting paste comprising an electrically conducting filler, a binder and an organic solvent.

21. A solid electrolytic capacitor obtained by sealing a

capacitor device comprising a valve-acting metal anode having formed on the surface thereof a dielectric film, a solid electrolyte layer and an electrically conducting layer, with an insulating resin exclusive of the exposed areas of the anode lead terminal and the cathode lead terminal, wherein the solid electrolyte layer is an electrically conducting polymer layer and the electrically conducting layer is formed of an electrically conducting layer containing metallic powder described in claim 15 or 20.

22. The solid electrolytic capacitor as claimed in claim 21, wherein the electrically conducting layer comprises an electrically conducting carbon layer formed on the electrically conducting polymer layer and an electrically conducting layer containing metallic powder described in any one of claims 15 to 20, which is formed on the conducting carbon layer.

23. The solid electrolytic capacitor as claimed in claim 21 or 22, wherein the electrically conducting polymer layer is formed of poly(3,4-ethylene-dioxythiophene).

24. The solid electrolytic capacitor as claimed in claim 2, 4, 6, 8, 9 or 22, wherein the electrically conducting carbon layer is formed of an electrically

conducting carbon paste predominantly comprising a conducting material, a binder and a solvent, and the conducting material contains artificial graphite in an amount of 80 mass% or more, and the artificial graphite has a fixed carbon content of 97 mass% or more, has an average particle size of 1-13 μm, an aspect ratio of 10 or less, and contains particles having a particle size of 32 μm or more in an amount of 12 mass% or less.

25. The solid electrolytic capacitor as claimed in claim 24, wherein the binder is a material of rubber-like elasticity which is swellable or suspendable in a solvent.

26. The solid electrolytic capacitor as claimed in claim 25, wherein the material of rubber-like elasticity which is swellable or suspendable in a solvent is at least one species selected from the group consisting of isoprene rubber, butadiene rubber, styrene/butadiene rubber, nitrile rubber, butyl rubber, an ethylene/propylene copolymer (e.g., EPM or EPDM), acrylate rubber, polysulfide rubber, a fluoropolymer, silicone rubber, and a thermoplastic elastomer.

27. The solid electrolytic capacitor as claimed in claim 24, wherein the conducting material accounts for 30-99 mass% and the binder accounts for 1-70 mass% of the entire solid content of the conducting carbon paste.

28. A process for producing a solid electrolytic capacitor comprising steps of forming a solid electrolyte layer and an electrically conducting layer on a dielectric film layer which has been formed on the surface of a valve-acting metal, which comprises covering the valve-acting metal having formed on the surface thereof a dielectric film with a solution containing a monomer of an electrically conducting polymer and a solution containing an oxidizing agent one after the other once or a plurality of times to form an electrically conducting polymer composition film on the dielectric film, a rubber-like elastic material being contained in at least one of the monomer-containing solution and the oxidizing agent-containing solution.

29. The process for producing a solid electrolytic capacitor as claimed in claim 28, wherein the electrically conducting polymer composition contains from 0.01 to 25 mass% of a rubber-like elastic material.

30. The process for producing a solid electrolytic capacitor as claimed in claim 28 or 29, wherein the rubber-like elastic material is fluororubber.

31. A process for producing a solid electrolytic capacitor comprising steps of forming a solid electrolyte

layer and an electrically conducting layer on a dielectric film layer which has been formed on the surface of a valve-acting metal, wherein the electrically conducting layer is formed on the solid electrolyte by using an electrically conducting paste comprising an electrically conducting material, a binder of rubber-like elasticity and a solvent.

32. The process for producing a solid electrolytic capacitor as claimed in claim 31, wherein the electrically conducting layer is a layer formed by using an electrically conducting paste comprising an electrically conducting material consisting of metallic powder, a binder of rubber-like elasticity and a solvent.

33. The process for producing a solid electrolytic capacitor as claimed in claim 31, wherein the step of forming electrically conducting layer comprises forming an electrically conducting carbon layer by using an electrically conducting carbon paste comprising a conducting material, a binder of rubber-like elasticity and a solvent, and then forming an electrically conducting layer containing metallic powder.

34. The process for producing a solid electrolytic capacitor as claimed in claim 31, wherein the step of forming an electrically conducting layer comprises

forming an electrically conducting carbon layer by using an electrically conducting carbon paste comprising a conducting material, a binder of rubber-like elasticity and a solvent, and then forming an electrically conducting layer containing metallic powder by using an electrically conducting paste comprising a conducting material consisting of metallic powder, a binder of rubber-like elasticity and a solvent.

35. The process for producing a solid electrolytic capacitor as claimed in any one of claims 31 to 34, wherein the step of forming solid electrolyte layer comprises covering the dielectric film with a solution containing a monomer of an electrically conducting polymer and a solution containing an oxidizing agent one after the other once or a plurality of times to form a film of an electrically conducting polymer composition, a rubber-like elastic material being contained in at least one of the monomer-containing solution and the oxidizing agent-containing solution.

36. The process for producing a solid electrolytic capacitor as claimed in any one of claims 31 to 35, wherein the solid electrolyte layer has a film-like or lamellar structure.

37. The process for producing a solid electrolytic

capacitor as claimed in claim 36, wherein the thickness of the film or each of the layers in the lamellar structure of the solid electrolyte falls within a range of approximately 0.1 μm to 0.3 μm.

38. A solid electrolyte formed from an electrically conducting polymer composition containing from 0.01 to 25 mass% of a rubber-like elastic material into a film-like or lamellar structure.

39. The solid electrolyte as claimed in claim 38, wherein the rubber-like elastic material is at least one of natural rubbers and synthetic elastomers.

40. The solid electrolyte as claimed in claim 38 or 39, wherein the rubber-like elastic material is fluororubber.

41. The solid electrolyte as claimed in claim 38, wherein the electrically conducting polymer is a polymer containing at least one repeating unit of a divalent group selected from pyrrole, thiophene, aniline and derivatives thereof.

42. A process for producing an article having a solid electrolyte formed of an electrically conducting polymer composition in the form of a film-like or lamellar structure, which comprises coating an article to be

provided with solid electrolyte formed of an electrically conducting polymer composition on the surface thereof with a solution containing a monomer of an electrically conducting polymer and a solution containing an oxidizing agent one after the other once or a plurality of times to form an electrically conducting polymer composition film, a rubber-like elastic material being contained in at least one of the monomer-containing solution and the oxidizing agent-containing solution.

43. The process for producing an article having a solid electrolyte as claimed in claim 42, wherein coating is effected by dipping, applying, spraying or spreading.

44. The process for producing an article having a solid electrolyte as claimed in claim 42, wherein the rubber-like elastic material is added to the monomer-containing solution and/or the oxidizing agent-containing solution in the form of solution or dispersion.

45. An electrically conducting paste for solid electrolytic capacitors comprising an electrically conducting filler containing metal powder and a binder mainly comprising fluororubber.

46. The electrically conducting paste as claimed in claim 45, wherein 80 mass% or more of the binder is

fluororubber.

47. The electrically conducting paste as claimed in claim 45, wherein 80 mass% or more of the electrically conducting filler is silver powder.

48. The electrically conducting paste as claimed in claim 45 or 47, wherein the electrically conducting filler has an average particle size of from 1 to 10 μm.

49. The electrically conducting paste as claimed in any one of claims 45, 47 or 48, wherein the electrically conducting filler content is from 50 to 95 mass% and the binder content is from 5 to 50 mass%.

50. The electrically conducting paste as claimed in any one of claims 45 to 49, which contains an organic solvent.

51. An electrically conducting carbon paste for solid electrolytic capacitors predominantly comprising an electrically conducting carbon material, a binder, and a solvent, wherein the conducting carbon material contains artificial graphite in an amount of 80 mass% or more, and the artificial graphite has a fixed carbon content of 97 mass% or more, has an average particle size of 1-13 μm, an aspect ratio of 10 or less, and contains particles having a particle size of 32 μm or more in an amount of

12 mass% or less.

52. The electrically conducting carbon paste for solid electrolytic capacitors as claimed in claim 51, wherein the binder is a material of rubber-like elasticity which is swellable or suspendable in a solvent.

53. The electrically conducting carbon paste for solid electrolytic capacitors as claimed in claim 52, wherein the material of rubber-like elasticity is at least one species selected from the group consisting of isoprene rubber, butadiene rubber, styrene/butadiene rubber, nitrile rubber, butyl rubber, an ethylene/propylene copolymer, acrylate rubber, polysulfide rubber, a fluoropolymer, silicone rubber, and a thermoplastic elastomer.

54. The electrically conducting carbon paste for solid electrolytic capacitors as claimed in any one of claims 51 to 53, wherein the conducting material accounts for 30-99 mass% and the binder accounts for 1-70 mass% of the entire solid content of the conducting carbon paste.